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ABSTRACT

The Texas Education Agency sought to create an enhanced electronic communications network (TENET) capable of transmitting information among and between the members of the public education system in Texas. They contracted with the Texas Higher Education Network (THEnet), an existing distributed network which is an NSF (National Science Foundation) regional network and connected to other networks worldwide through the Internet. THEnet includes online library catalogs, educational computer archives, public databases, and instructional hypermedia libraries, and provides a link for public education with higher education. Basic components of TENET include: electronic mail, an electronic bulletin board, electronic conferencing, electronic databases, workstation communication software, Telnet (a capability which permits resource sharing between networks), and remote file transfer. Forty educators became Master Trainers in the areas of use of the network, conference moderation, and curriculum integration. Since the implementation of the network, 15,000 users have obtained access, averaging 20,500 logins per week; over 1,000 new users apply for an account each month; and telecommunications projects have become an ongoing part of Texas education. (ALF)

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TENET
Texas Education Network

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Texas is a diverse state with more than 1,050 school districts that range in size from student populations of more than 190,000 to less than 10. More than 3.2 million students and over 200,000 teachers, support staff, and administrators work in Texas schools each day. The Texas Education Agency has long recognized the need for effective and low-cost communication among and between the more than 6,400 public school campuses, the 20 regional education service centers, colleges and universities, and other educational professionals in Texas. Since 1985, the Agency contracted for an electronic network with THE ELECTRIC PAGES, a commercial network operated by GTE. The TEA-NET (Texas Education Agency Electronic Network) provided electronic mail and bulletin boards to approximately 650 of the administrative offices in school districts in Texas. In November of 1988, the State Board of Education adopted the 1988 - 2000 Long-Range Plan for Technology. Incorporated within the plan was a request to establish a k-12 statewide communications network to link all school districts and their campuses. The requests were incorporated into Senate Bill 650 which was passed by the 71st Legislature. Senate Bill 650 (Section 14.042 of the Texas Education Code) authorized the establishment and maintenance of an electronic information transfer system, the Texas Education Network (TENET).

The Agency evaluated alternatives for the acquisition of services necessary for the creation and maintenance of an enhanced electronic communications network capable of transmitting information among and between the members of the public education system in Texas. Agency staff conducted a nationwide review of telecomputing networks, telecomputing hardware, software and training. The telecomputing network reviewed included: proprietary networks such as GTE, CompuServe, AT&T, AppleLink, America Online; statewide networks such as Pennsylvania's PennLink, Florida's FIRN, Virginia's, VA.PEN; and, other "grassroots' networks like FrEdMail and K12 Net. In addition, input was solicited from teachers, administrators, the regional service centers, and the educational organizations that had been utilizing the TEA-NET network.

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Review of existing and proposed networks resulted in the formulation of three essential requirements:

* Network standards which would allow this network to scale as growth and new advanced technology demanded.

* Network standards based upon TPC/IP and OSI protocols to permit inter-operability between networking systems.

* Network standards for UNIX based operating system to permit multi-tasking for educators utilizing the system.

Following a Request for Proposal process, which did not result in an award, the staff met with staff at the University of Texas System to consider using the Texas Higher Education Network (THEnet) as the network carrier. THEnet, currently providing connectivity to the majority of the major post-secondary institutions in the state, is a NSF regional network connected to thousands of other networks worldwide through the Internet. Analysis of the available networking alternatives showed that an approach based upon interagency contracts with The University of Texas System for telecommunications services was the option which would realize both the most cost-effective system and increased services to Texas K-12 students and educators. Several other states including Virginia, California and Florida are considering adopting similar models to bring connectivity to their public school educators.

The configuration of TENET is based upon a distributed design. The local hosts are a series of message processing and storage units (MPS) which are Unix systems with 24 Megabytes of memory, 1 Gigabyte of disk, and backup tape. The University of Texas System Office of Telecommunication Services houses one system which functions as the central host. Local phone access as well as 800 line service is provided in Austin. Seven other message processing and storage (MPS) computer systems are distributed across the state at university sites to store messages and support applications.

The Computation Center of The University of Texas at Austin provides help-desk services for the public education community in the use of the TENET through the expansion of existing THEnet information center operations. Applications on the system are designed and implemented by The University of Texas System Office of Telecommunication Services in cooperation with the Texas Education Agency.

By contracting with the existing distributed network of The Higher Education Network (THEnet) public school educators are brought onto an electronic network with rich resources which include online library catalogues, educational computer archives, public databases, and instructional

hypermedia libraries. The distributed computer system, when fully implemented, will permit local access from fifteen major metropolitan centers in the state. Toll-free lines are available to educators located outside the local calling areas. As the traffic increases on the network, local access will be expanded through additional nodes. Utilizing THEnet also recognized and supports national efforts to link higher education with public education and offers the potential for expanded access and extended services over the network.

Another key component to success networking involves adequate training and support. The Texas Education Agency worked with the Texas Center for Educational Technology to design curriculum for course delivery through a mix of expertise available at the Center, other universities, and regional education service centers. Training on the Texas Education Network is now being conducted statewide through the 20 regional education service centers through a training of trainers model.

The analysis of the interagency approach realizes the following advantages to the K-12 community:

* Utilization of an existing tax-supported network.
* Increased access to other state agencies serving public education.
* Increased access to the wealth of resources available in the university community.
* Training designed to meet unique needs and resources available to the state education community.
* Access to network services at minimal cost to Texas educators.
* Rapid implementation of networking services.
* Extension of the potential use of the system to include curriculum based projects as well as administrative projects, thus expanding the benefits of the network to teachers and students.

The basic components of the TENET network include:

* *Electronic mail*: The TENET network utilizes the PINE mailer designed by the University of Washington. The mail service extends beyond the community of educators in Texas to educators using other state, national, and international networks.

* *Electronic bulletin board*: The bulletin board, with capabilities for indexing and searching, makes it possible to post information from a many locations within the state for educators to access.

* *Electronic conferencing*: Conferencing differs from a bulletin board in that it establishes a climate of interaction thus allowing educators from different locations to discuss important topics.

* *Electronic Databases*: Electronic databases contain information accessible by all Texas educators.

* *Workstation communication software*: Software which will permit educators to edit and prepare files for transmittal, as well as request or send information to and from bulletin boards, conferences and databases, prior to actually connecting to the network, is an integral part of the design. This will minimize the time each educator will be directly connected to the network and will reduce the cost of telecommunications time. Currently the TENET network is utilizing Kermit. However, there are plans in place to customize the communication software.

* *Telnet*: A capability which permits resource sharing between networks is an important part of the network design which permits educators to have access to many resources on the Internet.

* *Remote file transfer - ftp*: This capability permits sharing computer files from many networks.

The benefits of the electronic network extend beyond just electronic mail and computer conferencing. The network supports collaboration between K-12 educators and post-secondary educators. For a nominal fee of $5 per year and no online cost, Texas administrators, teachers, and students have the capability to extend their communication to thousands of educators and students throughout the United States and countries around the world. By using the TENET network, not only are they able to utilize many major university libraries such as the University of Texas, Texas A&M, University of California, University of Hawaii, and University of Colorado, but they also have access to resources such as NASA's Spacelink in Huntsville, Alabama. By utilizing NASA, teachers are able to communicate with astronauts and scientists as well as retrieve classroom materials for their own use. Other resources on TENET include UPI news, UN News, CNN Newsroom lessons, and Newsweek Lessons. The network also features an online encyclopedia, a study skills guide, and access to the ERIC digest.

The capabilities of the TENET network also include electronic mail gateways to many other major networks. Some of these networks include AppleLink, CompuServe, MCI mail, AT&T mail, FrEdMail and Fidonet. These capabilities are available to Texas educators without an additional charge.

Forty Texas educators, representing a broad range of expertise, were selected as TENET Master Trainers. They received training in three areas: use of the network, conference moderation, and curriculum integration. Twenty of the trainers were from each of the educational service centers. The

additional twenty trainers represented school librarians, math supervisors, computer coordinators, and representatives from professional organizations such as the Texas Computer Education Association (TCEA), the Texas Association of School Boards (TASB), the Texas Association for Supervision and Curriculum Development (TASCD), and the Texas State Teachers Association (TSTA).

The TENET network uses USENET conferencing software on the system to create Texas specific conferences. All of the TENET conferences are moderated by educators so that as telecommunications is introduced into classroom, an understanding of how to create an environment for learning and network etiquette can be established. All of the educators functioning in the role as a moderator on TENET will have had training to help nurture and guide conference participants as they begin to explore the use of telecommunications.

Since the network began operation on August 26, 1991, more than 15,000 users are accessing TENET. They average 20,500 logins per week and more than 1000 new users apply for an account each month. Telecommunications projects are an ongoing part of many Texas educators. One such project is an example of how telecommunications can bring students, teachers and members of the community together through collaboration across state and national boundaries. This effort brought students, teachers, and community members in El Paso closer to their peers in the East Texas community of Sour Lake. During the past several years, the Agency has provided support for other such projects tailored to specific needs by classroom teacher. Examples of such projects include projects which enabled handicapped students to share their writing with other geographically dispersed students throughout the state and nation. In addition, the Induction Year pilot supported new teachers as they were inducted into the profession of teaching. The through a collaborative effort with educators in the state, the Agency supports the use of telecommunications as an instructional application which extends learning beyond physical barriers and time constraints.